

Claims

1.(currently amended) A polymerizable nanocomposite material in solid or gel form, containing

- a) from 4.9 to 95.9% by weight of a soluble polymer;
- b) from 4 to 95% by weight of a partially or fully condensed silane selected from ~~the following group~~: acrylosilanes, epoxysilanes, acryloalkoxysilanes, acryloepoxysilanes, epoxyalkoxysilanes, alkoxysilanes and alkylalkoxysilanes, the silane having an inorganic condensation ratio of from 33 to 100% and an organic conversion ratio of from 0 to 95%;
- c) from 0 to 60% by weight of an acrylate;
- d) from 0.1 to 50% by weight of surface-modified nanoscale particles selected from ~~the following group~~: oxides, sulfides, selenides, tellurides, halides, carbides, arsenides, antimonides, nitrides, phosphides, carbonates, carboxylates, phosphates, sulfates, silicates, titanates, zirconates, aluminates, stannates, plumbates and mixed oxides thereof;
- e) from 0 to 50% by weight of a softener;
- f) from 0 to 5% by weight of an additive selected from thermal or photochemical crosslinking initiator, sensitizer, wetting agent, adhesion promoter, rheological additive, antioxidant, stabilizer, colorant, photochromic and thermochromic substance, ~~or~~ and a combination thereof; further where weight, in each case is expressed in terms of the total weight ~~(dry weight)~~ of solids in the nanocomposite material.

2. (currently amended) The nanocomposite material as claimed in claim 1, characterized in that the soluble polymer a) is selected from ~~a~~-polyacrylate, polymethacrylate, polyepoxide, polyvinyl alcohol, polyvinyl acetate ~~or~~ and polyvinyl butyral, further where the polymer ~~which~~ is soluble in an organic solvent.

3. (currently amended) The nanocomposite material as claimed in claim 1 ~~or 2~~, characterized in that the silane b) is selected from methacryloxypropyltrimethoxysilane, acryloxypropyltrimethoxysilane, dimethyldimethoxysilane, dimethyldiethoxysilane, 3-glycidyloxypropyltrimethoxysilane, vinyltriethoxysilane, methyltriethoxysilane ~~or~~ and a combination thereof.

4. (currently amended) The nanocomposite material as claimed in ~~at least one of claims 1 to 3~~, characterized in that the acrylate c) is selected from methyl methacrylate, ~~or~~ a diol diacrylate ~~or~~ and diol dimethacrylate.

5. (currently amended) The nanocomposite material as claimed in ~~at least one of claims 1 to 4~~, characterized in that the nanoscale particles d) are surface-modified with compounds selected from compounds containing (meth)acryl, allyl, vinyl, epoxy, hydroxyl, carboxyl, ~~or~~ amino groups ~~or~~ and a combination thereof.

6. (currently amended) The nanocomposite material as claimed in ~~at least one of claims 1 to 5~~, characterized in that the nanoscale particles are selected from surface-modified SiO₂, TiO₂, ZrO₂, and ~~or~~ Ta₂O₅ particles.

7. (currently amended) The nanocomposite material as claimed in ~~at least one of claims 1 to 6~~, containing from 0.1 to 30% by weight of a softener.

8. (currently amended) A process for the production of a nanocomposite material as claimed in ~~one or more of claims 1 to 7~~, characterized in that the silane b) is partially or fully condensed by adding a hydrolyzer and optionally polymerized by UV irradiation, and mixed with one or more of the components a), c) to f), or the silane b) is first mixed with one or more of the components a), c) to f) and then condensed and optionally polymerized, and optionally organic solvent is subsequently removed.

9. (currently amended) Use of a nanocomposite material as claimed in ~~one or more of claims 1 to 7~~ for the production of a planar material with a refractive index gradient.

10. (currently amended) A film with a refractive index gradient, ~~consisting essentially of~~ comprising one or two transparent plastic films which are coated with a nanocomposite material as claimed in ~~one or more of claims 1 to 7~~, further where in which a refractive index gradient has been produced by applying an electrical potential difference, electron irradiation, holography, lithography or by local illumination.

11. (currently amended) A process for the production of a film with a refractive index gradient as claimed in claim 10, characterized in that a nanocomposite material as claimed in ~~one or more of claims 1 to 7~~ is applied to a transparent plastic film, organic solvent is allowed to evaporate, optionally the nanocomposite layer is laminated with a transparent cover film, a refractive index gradient is produced in the nanocomposite layer by applying an electrical potential difference, electron irradiation, holography, lithography or by local illumination, and the refractive index gradient is subsequently fixed by complete thermal and/or light-induced crosslinking of the nanocomposite material.